TNReady Integrated Math II Blueprint

Clusters on Part I	# of Items	% of Part I	Additional Clusters on Part II (All Part I Clusters will also be assessed on Part II)	# of Items	% of Part II	% of Test
 Number Systems: Real and Complex Extend the properties of exponents to rational exponents Use properties of rational and irrational numbers Perform arithmetic operations with complex numbers Use complex numbers in polynomial identities and equations 	2–4	9–18%	No additional clusters	4–6	10–15%	13-15%
Structure and Operations with Expressions Use units to solve problems Interpret the structure of expressions Write expressions in equivalent forms Perform arithmetic operations on polynomials	4–7	18–32%	No additional clusters	3–5	7–13%	15–16%
Creating Equations • Create equations that describe numbers or relationships	1–2	5–9%	No additional clusters	0–2	0–5%	3–5%
Reasoning with Equations and Inequalities • Understand solving equations as a process of reasoning and explain the reasoning • Solve equations in one variable	2–3	9–14%	Reasoning with Equations and Inequalities • Solve systems of equations	5–8	13-20%	13–16%
 Interpreting and Building Functions Interpret functions that arise in applications in terms of the context Analyze functions using different representations Build a function that models a relationship between two quantities 	5–7	23–32%	Interpreting and Building Functions • Build new functions from existing functions	8–12	20–30%	24–27%

Geometry: Similarity, Right Triangles, Trigonometry, and Dimension • Understand similarity in terms of similarity transformations • Prove theorems involving similarity • Define trigonometric ratios and solve problems involving right triangles • Explain volume formulas and use them to solve problems	3–4	14–18%	No additional clusters	7–8	18-20%	17–19%
No content from these clusters will be assessed on Part I	0	0%	Interpreting Data and Understanding Probability • Summarize, represent, and interpret data on two categorical and quantitative variables • Understand independence and conditional probability and use them to interpret data • Use the rules of probability to compute probabilities of compound events in a uniform probability model	5–6	13-15%	8–10%
Total	21–23	100%	Total	40–42	100%	100%

Reading the Revisions: The totals on the blueprints released in Spring 2015 were estimated totals of the test forms. The revised blueprints reflect actual totals for the test forms. The Form Summaries line provides the range of actual form totals. There are multiple forms per grade.

Part I – Calculator Allowed

Cluster	Standards		# of Items
	N-RN.A-Extend the properties of exponents to rational exponents	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
	N-RN.B-Use properties of rational and irrational numbers.	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	
Number System: Real and Complex	N-CN.A- Perform arithmetic	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	2–4
	operations with complex numbers	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
N-CN.B-Use complex numbers in polynomial identities and equations.	complex numbers in polynomial identities and	Solve quadratic equations with real coefficients that have complex solutions	
	N-Q.A – Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	
	A-SSE.A – Interpret the structure of expressions	 Interpret expressions that represent a quantity in terms of its context. ★ b. Interpret complicated expressions by viewing one or more of their parts as a single entity. Use the structure of an expression to identify ways to rewrite it. 	
Structure and Operations with Expressions	A-SSE.B-Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	4–7
Perf arith operat	A-APR.A- Perform arithmetic operations on polynomials	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	
	A-CED.A-Create equations that	Create equations and inequalities in one variable and use them to solve problems. Create equations in two or more variables to represent relationships between	1.2
Creating Equations	describe numbers or relationships	quantities; graph equations on coordinate axes with labels and scales. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	1–2

Reasoning with	A.REI.A - Understand solving equations as a process of reasoning and explain the reasoning	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	
Equations and Inequalities	A-REI.B- Solve equations and inequalities in one variable	 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)² = q that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for x² = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. 	2–3
	F.IF.B - Interpret functions that arise in applications in terms of the context	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
Interpreting and Building Functions		 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 	5–7
bulluling Full-ctions	functions using different representations	 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. 	
	F.BF.A - Build a function that models a relationship between two quantities	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	

	G.SRT.A- Understand similarity in terms of similarity transformation	 Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of sides. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. 	
Geometry: Similarity, Right Triangles, Trigonometry and Dimensions	G.SRT.B- Prove theorems involving similarity	Prove theorems about triangles. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	3–4
	G.SRT.C- Define trigonometric ratios and solve problems involving right triangles G.GMD.A-Explain volume formulas and use them to	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. Explain and use the relationship between the sine and cosine of complementary angles. Use trigonometric ratios and the Pythagorean theorem to solve right triangles in applied problems. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use volume formulas for cylinders, pyramids, cones, and spheres to solve	
	solve problems	problems.	

<u>Part II – Calculator and Non-Calculator Portions</u>

Cluster	Standards		# of Items
	N-RN.A-Extend the properties of exponents to rational exponents N-RN.B-Use properties of rational and	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	
Number System: Real and Complex	irrational numbers. N-CN.A- Perform arithmetic	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	4–6
	operations with complex numbers	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
ic	N-CN.B - Use complex numbers in polynomial identities and equations.	Solve quadratic equations with real coefficients that have complex solutions	
	N-Q.A – Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	
	A-SSE.A – Interpret the structure of	Interpret expressions that represent a quantity in terms of its context. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	
Structure and	expressions	Use the structure of an expression to identify ways to rewrite it.	
Operations with Expressions	A-SSE.B-Write expressions in equivalent forms to solve problems	 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. 	3–5
	A-APR- Perform arithmetic operations on polynomials	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	
Creating Equations	A-CED-Create equations that describe	Create equations and inequalities in one variable and use them to solve problems. Create equations in two or more variables to represent relationships between	0–2
Creating Equations	numbers or relationships	quantities; graph equations on coordinate axes with labels and scales. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	0-2

Cluster	Standards		# of Items
Reasoning with Equations and Inequalities A	A.REI.A - Understand solving equations as a process of reasoning and explain the reasoning	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	
	A-REI.B- Solve equations and inequalities in one variable	 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x - p)² = q that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for x² = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. 	5–8
	A.REI.C- Solve systems of equations	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	
	F.IF.B - Interpret functions that	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	
	arise in applications in	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	
	terms of the context	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
	F.IF.C- Analyze functions using	 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 	8–12
	different representations	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions.	
		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	

function that models a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	from a context.
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Cluster	Standards		
	F.BF.B- Build new functions from existing functions	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, k $f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
	G.SRT.A- Understand similarity in	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	
	terms of similarity transformation	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	
Geometry: Similarity, Right Triangles,	G.SRT.B- Prove	Prove theorems about triangles.	7.0
Trigonometry and Dimensions	theorems involving similarity	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	7–8
	G.SRT.C- Define trigonometric ratios and solve problems	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	
		Explain and use the relationship between the sine and cosine of complementary angles.	
	involving right triangles	Use trigonometric ratios and the Pythagorean theorem to solve right triangles in applied problems.	
	G.GMD.A- Explain volume	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	
	formulas and use them to solve problems	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	
Interpreting Data and Understanding	S.ID.A- Summarize, represent, and interpret data on two categorical and quantitative variables	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals.	5–6
Probability	S.CP.A- Understand independence and conditional	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	
	probability and use them to interpret data	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	

Cluster	Standards		# of Items
		Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .	
		Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	
		Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	S.CP.B- Use the rules of probability to compute probabilities of	Find the conditional probability of <i>A</i> given <i>B</i> as the fraction of <i>B</i> 's outcomes that also belong to <i>A</i> , and interpret the answer in terms of the model.	
	compound events in a uniform probability model	Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.	

Overall Blueprint (Includes Part I and Part II)

Cluster	Standards		# of Items
	N-RN.A-Extend the properties of exponents to rational exponents N-RN.B-Use properties of rational and irrational	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	
Number System: Real and Complex	numbers N-CN.A- Perform arithmetic operations with complex numbers	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	8–9
	N-CN.B- Use complex numbers in polynomial identities and equations	Solve quadratic equations with real coefficients that have complex solutions.	
	N-Q.A – Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	
Structure and	A-SSE.A – Interpret the structure of expressions	Interpret expressions that represent a quantity in terms of its context. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. Use the structure of an expression to identify ways to rewrite it.	
Structure and Operations with Expressions	A-SSE.B-Write expressions in equivalent forms to solve problems	 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. 	9–10
	A-APR.A- Perform arithmetic operations on polynomials	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	
Creating Equations	A-CED.A-Create equations that describe numbers or relationships	Create equations and inequalities in one variable and use them to solve problems. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	2–3

Cluster	Standards		# of Items
		Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	
	A.REI.A - Understand solving equations as a process of reasoning and explain the reasoning	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	
Reasoning with Equations and Inequalities	A-REI.B- Solve equations and inequalities in one variable	 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x - p)² = q that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for x² = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. 	8–10
	A.REI.C- Solve systems of equations	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	
Interpreting and Building Functions	F.IF.B - Interpret functions that arise in applications in terms of the context	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
	F.IF.C- Analyze functions using	 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 	15–17
	different representations	 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. 	
	F.BF.A- Build a	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Write a function that describes a relationship between two quantities.	
	function that	a. Determine an explicit expression, a recursive process, or steps for calculation	

Cluster	Standards		# of Items
	models a relationship between two quantities	from a context. b. Combine standard function types using arithmetic operations.	
	F.BF.B - Build new functions from existing functions	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, k $f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
Geometry: Similarity, Right Triangles, Trigonometry and Dimensions	G.SRT.A- Understand similarity in terms of similarity transformation	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs	11–12
		of sides. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	
	G.SRT.B- Prove theorems involving similarity	Prove theorems about triangles.	
		Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	
	G.SRT.C- Define trigonometric ratios and solve problems involving right triangles	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	
		Explain and use the relationship between the sine and cosine of complementary angles. Use trigonometric ratios and the Pythagorean theorem to solve right triangles in applied problems.	
	G.GMD.A- Explain volume formulas and use them to solve problems	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	
		Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	
Interpreting Data and Understanding Probability	S.ID.A- Summarize, represent, and interpret data on two categorical and quantitative variables	 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals. 	5–6
	S.CP.A- Understand independence and conditional probability and use them to interpret data	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	

Cluster	Standards		# of Items
		Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .	
		Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	
		Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	S.CP.B- Use the rules of probability to compute probabilities of	Find the conditional probability of <i>A</i> given <i>B</i> as the fraction of <i>B</i> 's outcomes that also belong to <i>A</i> , and interpret the answer in terms of the model.	
	compound events in a uniform probability model	Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.	